NATIONAL WEATHER SERVICE, TUCSON ARIZONA

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INITIAL FORECAST FOR THE 2010 MONSOON: A WHOLE LOT OF QUESTION MARKS

ERIK PYTLAK, SCIENCE AND OPERATIONS OFFICER

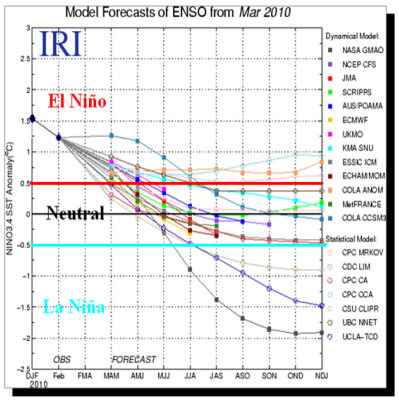
As our welcome, badly needed, wet winter and early spring draws to a close, our attention will soon turn to our late spring dry season and the upcoming monsoon. After a strong El Niño and unusually heavy precipitation like we had this winter, the following monsoon tends to be either average, or weaker than usual. A weak monsoon is usually the result of several factors, including above average snowpack over the central Rockies, soil wetness over the central and Southern Plains, and warm sea surface temperatures over the tropical Pacific remaining from the El Niño. If these three factors combine, it can make it more difficult for the monsoon high to form, move north, and bring the moist tropical air into the southwest U.S. which fuels our summer thunderstorms.

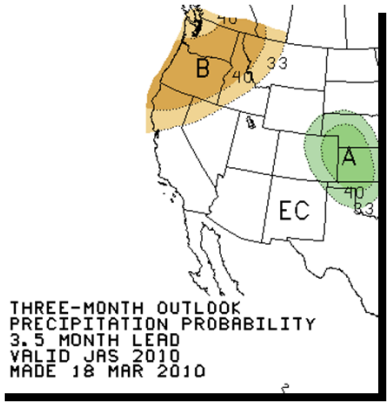
However no two El Niño years are alike. While we received above average winter precipitation in Arizona and New Mexico, the El Niño did not have the same impact over Colorado and Utah, where the snowpack is actually a little below average for early April. During El Niño winters, heavy precipitation also tends to fall over the southern Plains. However, we did not see that this winter, either. Precipitation across Texas, Oklahoma and Kansas was actually near average, thus that part of the country is entering spring with near normal soil moisture. Both of these key signals do not point toward the possibility of either a stronger or weaker monsoon high – at least right now.

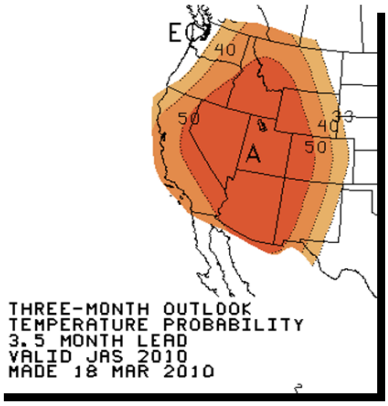
The sea surface temperature forecast in the tropical Pacific is also highly uncertain this summer. As the graphic shows from the International Research Institute for Climate and Society (IRI), the computer models are not agreeing with each other, with some suggesting a lingering El Niño from June through September (average sea surface temperatures 0.5°C or more above average), some forecasting neutral conditions (between 0.5°C above, and 0.5°C below average), and some forecasting a rapid shift to La Niña (average seas surface temperatures 0.5°C or more below average). With so much uncertainty, it is difficult to tell at this point what we will be facing later this summer.

Currently, the official forecast for the NOAA/NWS Climate Prediction Center calls for equal chances for above average, near average, or below average rainfall this summer. There is also no indication either way that the monsoon will arrive in the southwest U.S. early, late, or right on schedule around the first week of July. The only thing we are fairly confident about is that after a rather cool April, there is at least a 50% chance that temperatures in Arizona will be above average this summer – so get ready for a hot one. What is unclear, at least right now, is if the expected summer heat will be accompanied by a weak, average, or strong monsoon. Hopefully we'll know more later this spring.

Inside this issue:







EL NINO BRINGS WET WINTER TO SOUTHEAST ARIZONA

JOHN GLUECK, SENIOR FORECASTER AND CLIMATE FOCAL POINT

In the Fall/Winter edition of the Coyote Crier, Science and Operations Officer (SOO) Erik Pytlak wrote an article about the possible wet winter due to the strengthening El Nino in the Pacific. The first half of the 2009-2010 Winter season started off drier than normal as a few weak storms moved through the area. The atmospheric pattern across the eastern Pacific and western United States during the second half of 2009-2010 Winter season became more conducive for El Niño driven storms to move through Arizona.

Rainfall amounts across southeast Arizona, using data that spotters called and several other sources like rainlog.org and the Pima County Regional Flood Control District gages, ranged from three to eight inches with localized spots between ten and 15 inches. Most locations recorded their wettest winter since the 1997-98 winter season.

Severe drought conditions prevailed across southeast Arizona before the start of the 2009-2010 Winter season. Due to the wet winter, drought conditions by early March had improved to abnormally dry.

2009-2010 winter rainfall amounts across southeast Arizona

Location	2009-10 Winter rainfall	Normal winter rainfall (DJF)	% of normal
Tucson International Airport	4.29”	2.90”	148%
Vail	5.51”	3.14”	175%
Arivaca	6.60”	4.01”	165%
Ajo	4.24”	2.02”	191%
Organ Pipe Cactus N. M.	4.03”	2.80”	144%
Oracle	14.74”	7.33”	201%
Picacho	5.96”	3.31”	180%
Nogales	5.81”	3.87”	150%
Patagonia	6.76”	4.13’	164%
Canelo	10.01”	3.99”	251%
Fort Thomas	4.79”	3.16”	152%
Safford Ag. Center	4.29”	2.42”	177%
Duncan	5.02”	3.09”	162%
Benson	3.08”	2.45”	126%
Pearce-Sunsites	4.12”	2.62”	157%
Willcox	4.12”	3.36”	123%
Bisbee	6.62”	5.02”	132%
Coronado N.M. HQ	10.91”	5.48”	199%
Sierra Vista	4.52”	2.82”	160%
Tombstone	4.20”	2.85”	147%
Hereford (Y Lightning Ranch)	7.65”	3.08”	248%
Bowie	5.27”	3.12”	169%
San Simon	5.52”	2.89”	191%
Chiricahua N.M.	8.72”	4.86”	179%
Douglas	3.04”	2.45”	124%
McNeal	3.15”	2.23”	141%

SALUTING A RED FLAG

STEVEN M. REEDY, FIRE WEATHER FOCAL POINT AND INCIDENT METEOROLOGIST

Though generally aimed at the Fire Community, be it fire fighters, incident commanders and so on, the Red Flag Warnings issued by the National Weather Service have begun to draw the attention of the public and news media over the past few years. And with good reason. While nearly everyone is familiar with the Severe Thunderstorm and Flash Flood Warnings that Weather Service offices issue (for us in Southeast Arizona, the bulk of these fall during our Monsoon Season), much fewer are familiar with Fire Weather Watches and Red Flag Warnings. Typically issued during the dry spring months of April, May and June (possibly early July if the monsoon is late in starting up!), Fire Weather Watches and Red Flag Warnings are indicators of what is typically called 'the severe weather of the dry season'. This article will help shed some light as to what these products are and what they mean for the general public.

The first thing to do here is to explain what a Fire Weather Watch/Red Flag Warning is. The basic criteria a forecaster must consider when preparing to issue either a Fire Weather Watch or a Red Flag Warning is as follows:

Sustained wind speeds meeting or exceeding 20 MPH or wind gusts of 35 MPH or greater.

Relative Humidity values of 15% or lower.

NFDRS adjective fire danger rating of "High" or greater.

The above conditions are expected to persist for 3 or more hours.

If a forecaster believes these conditions will be met a day and a half to two days in the future, then he or she issues a Fire Weather Watch. This prepares concerned parties, again, mainly within the Fire Community, that hazardous conditions may arise. If these conditions are expected within the next 24 hours, or are already occurring, then the forecaster will issue a Red Flag Warning.

Now that you know what the criteria for a Red Flag Warning are, what does the Warning itself actually mean? At its heart, the Red Flag is more a warning about fire behavior than it is about a fire in general. If a Red Flag is issued, forecasters are expecting the above conditions to create fire behavior that is erratic with rapid growth likely. And that makes sense as you look at the criteria. If winds are strong and gusty, fire is more likely to spread. Low relative humidity means there's less moisture in the air to keep fuels from burning. While relative humidity deals with how much moisture is in the air, the NFDRS fire danger rating helps to indicate the average amount of moisture within local fuels and vegetation. As these values enter into "High", "Very High" or "Extreme", fuels in those areas have become so dry that they are very likely to burn. As would be expected, the National Weather Service is responsible for the wind and relative humidity portion of the forecast, while the US Forest Service provides the NFDRS fire danger rating forecast. With that said, many times the issuance of a Fire Weather Watch or Red Flag Warning will be a collaborative effort between forecasters at the local Weather Service office and the Forest Service's Predictive Services, located at Geographic Area Coordination Centers (or GACCs). In the case of southeast Arizona, this would be the Southwest Coordination Center (SWCC) in Albuquerque, New Mexico.

Though it is called "the severe weather of the dry season", there are some important things to remember that make Fire Weather Watches/ Red Flag Warnings different from what is generally associated with severe weather. Most are familiar with the relationship between a Severe Thunderstorm Watch and a Severe Thunderstorm Warning. The former indicates that conditions are favorable for severe thunderstorm development while the latter indicates that a severe thunderstorm is occurring or is imminent. Fire Weather Watches/Red Flag Warnings work like this, in a way, and yet they don't. They are similar to Severe Thunderstorm Watches/Warnings in that the Fire Weather Watch means that the aforementioned criteria are expected to occur while the Red Flag means that those criteria are occurring or are imminent. The important thing to remember though is that Fire Weather Watches and Red Flag Warnings are ***NOT*** issued to indicate that there is a wildfire present within the warned area. But if there is a fire present within the boundaries of a Red Flag Warning, then conditions are right for that fire to grow VERY rapidly, and those in the area need to be alert!

As the general public becomes more familiar with Fire Weather Watches and Red Flag Warnings, it is the hope that this will impact the number of large fires that require large scale containment efforts. If you see that a Fire Weather Watch or Red Flag Warning has been posted, then be aware of it and act accordingly. Refrain from building any bonfires. If smoking outside, be mindful of where the ash falls. Be aware of sparks big and small. Avoid driving any vehicle through tall grass or vegetation, as hot pipes can also start fires. By acting cautiously and responsibly during a Fire Weather Watch or a Red Flag Warning, you're helping to diminish the number of potentially large wildfires and saving both homes and lives.

Three Forks Fire, Near Nutrioso, AZ June 2004

SEVERE HAIL SIZE IS OFFICIALLY ONE INCH IN DIAMETER

The National Weather Service (NWS) has issued Severe Thunderstorm Warnings whenever a thunderstorm is forecast to produce wind gusts to 58 miles per hour (50 knots) or greater and/or hail size 3/4 inch (penny-size) diameter or larger. For the past few years, offices that cover areas of Kansas have experimented using a warning criterion of one inch diameter hail. During the spring and early summer of 2009, this experiment expanded to other areas in the Central and Western U.S. Beginning January 5, 2010, the minimum size for severe hail nationwide increased to one inch (quarter-size) diameter. There will not be a change to the wind gust criterion of 58 mph.

This change is based on research indicating significant damage does not occur until hail size reaches 1 inch (quarter-size) in diameter, and as a response to requests by core partners in emergency management and the media. Particularly in areas of the Central U.S., the frequency of severe thunderstorm warnings issued for penny-size and nickel size hail might have desensitized the public to take protective action during a severe thunderstorm warning

In areas that experimented with changing to the one inch hail criterion, media partners stated their user feedback suggests warnings are now more meaningful. In addition, television networks receive fewer viewer complaints from breaking into programming for non-damaging storms. The Emergency Management community in those areas agreed that warnings carry more weight, and spotters now concentrate on the more significant events.

The above article and photo provided by the National Weather Services Office of Climate, Water and Weather Services and the Warning Decision Training Branch in Norman, Oklahoma

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Observation Program Leader.....Mic Sherwood

Hydrometeorological Technician.....Hans Hanson

MONSOON SAFETY

Although the monsoon brings welcome rains and relief from the summer heat, the thunderstorms that come with the monsoon bring their own hazards. This is the most dangerous time of year weather-wise in Arizona, so before and during the season, it is a very good idea to review these safety tips:

Lightning:

- If you hear thunder, you are close enough to a storm to be struck by lightning. Go to a safe place immediately! The safest locations are sturdy buildings and hard-topped vehicles.
- Get away from open areas, including armadas, porches, trees, convertible cars, swimming pools, and open areas.
- Plan outdoor activities to avoid being outside between mid afternoon and mid evening, especially in higher elevations where lightning is more common.
- Do not touch any wires or plumbing inside a building
- Remember that it does not have to be raining for you to be struck by lightning. Lightning can strike up to 60 miles away from the nearest rainfall!
- Bring pets indoors. Lightning and thunder are very scary for pets, and they are likely to panic or even run away to try and escape the storm.
- If someone is struck by lightning, call 911 immediately!

Flash Floods:

- Flash floods are common in Arizona. There are thousands of low water crossing and dips which flood every summer. Know where they are, and avoid them during heavy rains.
- Never ever drive into a flooded roadway. The water depth is very easy to misjudge, and the road itself may be damaged or destroyed underneath. It only takes about 1 to 2 feet of water to float most vehicles, including SUVs.
- Never drive around barricades. They are there for a reason – usually because flash flooding is about to take place, is already happening or the road is damaged by flooding and is unsafe.
- Never allow children to play near washes or storm drains after any rainfall, no matter how light. These flood easily and rapidly, and storm drains are usually so large that children can be swept away.
- Beware of distant thunderstorms, especially if they're over mountains. Flash flooding can occur many miles away from the thunderstorm as the runoff flows into the valleys and deserts.
- Do not camp overnight near streams during the monsoon. Although many of our thunderstorms occur during the afternoon and evening, some of our worst flash floods have occurred in the middle of the night.
- Hikers and mountain bikers should try to get out early in the day to avoid the dangers of not only flash flooding, but also lightning. Wherever you are hiking during the monsoon, be aware of your escape routes, follow ranger instructions, and be prepared to move to higher ground quickly.

Dust storms:

- These are an underrated killer in Arizona! Straight lines winds in any thunderstorm can lift huge clouds of dust and reduce visibilities to near zero in seconds, which can quickly result in deadly, multi-vehicle accidents on roadways.
- Dust storms are more common in the early part of the monsoon, near agricultural areas, and near the Willcox Playa in Cochise County. Use caution in these areas any time thunderstorms are nearby.
- If you encounter a dust storm, pull off the road immediately. Turn off your headlights and put your vehicle in "PARK," and take your foot off the brake. Other motorists may tend to follow taillights in an attempt to get through the dust storm, and may strike your vehicle from behind.
- Dust storms usually last a few minutes, and up to an hour at most. Stay where you are until the dust storm passes.

Straight-line winds:

- Thunderstorm wind gusts in Arizona almost always exceed 40 mph. The strongest straight line wind gusts can exceed 100 mph, and can produce damage similar to a tornado! Anytime a thunderstorm approaches, no matter how weak it seems, move indoors to avoid flying debris. Winds rushing down from a thunderstorm can develop very quickly.
- When a Severe Thunderstorm Warning is in effect, it means damaging wind gusts of 60 mph or higher are likely. Move into a central interior room. Stay away from windows.
- Unanchored mobile homes are NOT safe in any severe thunderstorm, and even anchored mobile homes can be heavily damaged in winds over 80 mph. Move to a more sturdy structure.
- Stay away from trees. The vast majority of people are killed or injured in severe thunderstorms by falling trees, from flying debris, or from downed power lines.
- Never touch a downed power line, even if it appears dead. Assume that it is live. Call for help instead.
- Straight line winds can travel dozens of miles away from the thunderstorm that produced them. If the wind suddenly shifts and blows toward you from an approaching storm, while the temperature either becomes much colder or much hotter, the winds are likely to become even stronger. Move indoors!
- Before the monsoon, it is a good idea to either secure loose outdoor furniture and garbage cans, or move them indoors. These are frequently blown around in our summer thunderstorms – even the weakest ones.

National Weather Service
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WEATHER SPOTTER TRAINING SESSIONS 2010

Date	Time	Location
April 17, 2010	1:30 pm	U of A Campus Environment and Natural Resources Building 520 N. Park Ave. Suite 253 Tucson, AZ
April 26, 2010	6:30 pm	U of A Campus Environment and Natural Resources Building 520 N. Park Ave. Suite 253 Tucson, AZ
May 4, 2010	6:30 pm	Ethel Berger Center 2950 E. Tacoma St. Sierra Vista, AZ
May 10, 2010	6:30 pm	Oro Valley Town Hall Complex 11000 N. La Cañada Dr. Oro Valley, AZ
May 14, 2010	6:00 pm	Douglas Fire Station 1400 E. 10th St. Douglas, AZ
May 17, 2010	6:00 pm	Greenlee County Courthouse 253 5th & Leonard Clifton, AZ
May 26, 2010	6:30 pm	Sahuarita Town Hall 375 W. Sahuarita Way Sahuarita, AZ
June 1, 2010	6:30 pm	Santa Cruz County Building 2150 N. Congress Dr. Nogales, AZ
June 3, 2010	6:00 pm	Office of Emergency Management Sells, AZ
June 5, 2010	10:00 am	Kirk-Bear Canyon Library 8959 E. Tanque Verde Rd. Tucson, AZ
June 12, 2010	2:00 pm	Oro Valley Town Hall Complex 11000 N. La Cañada Dr. Oro Valley, AZ

What You As A Skywarn Spotter Should Report??

Tornado: A Tornado or a funnel cloud

Heavy Rain: A Half Inch or more in less than an hour

Hail: Dime size hail (1/2 inch) or larger

High Wind: Estimated or measured 45 mph or greater

Flooding: Any Kind of Flooding

Snow: One inch or more (2 inches if above 5000 feet)

Visibility: Less than one mile

Death/ Injury: Any weather related reason

Damage: Any weather related reason

(520) 670-5162 or 1-800-238-3747